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N. A. C. A. BULLETIN

Vol. XIV, No. 14 March 15, 1933

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This bulletin is published semi-monthly by the National Association of Cost Accountants, 1790 Broadway, New York. Subscription price $15.00 per year. Entered at the Post Office, New York, N. Y., as second class matter August 28, 1925, under the Act of March 3, 1879.

EDITORIAL DEPARTMENT NOTE

Printing is one of the very oldest of the arts. Many of the practices in the printing industry have been built around custom and tradition and, because of this, the industry has been perhaps slow in adopting many of the modern ideas and principles of management which have been the chief factors in the rapid growth and development of many of our more modern businesses. Great progress has been made in the printing industry during the past half century, due in part to the application of the principles of modern scientific management. In this issue of our Bulletin we present a paper explaining how modern engineering principles may be, and should be, applied in the printing industry.

Harry H. Lang, the author of this paper after completing a short course in industrial accounting and business administration in a business college in the Middle West, entered the industrial accounting field.

He spent a few years with several concerns throughout the Middle West gaining practical experience and knowledge of accounting, after which he became associated with Sears Roebuck & Company, being assigned to the position of General Factory Accountant in one of the subsidiary divisions in the southern part of Indiana, known as the Hercules Corporation. Here, Mr. Lang gained valuable experience, inasmuch as he was in direct charge of the factory and cost accounting for the five plants located at this point, manufacturing five separate and distinct products.

Since 1918, Mr. Lang has been connected with the Stecher Lithographic Company, where his activities embraced the responsibility of modernizing the somewhat intricate cost system used in the lithographing industry.

At the present time he holds the position of Controller in his company. Mr. Lang has been an active member of our Rochester Chapter since 1925 and served as its president during the year 1930-31.

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March 15, 1933

ENGINEERING PRINCIPLES

Applied to the Printing Industry

By Harry H. Lang, Controller,
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MANAGEMENT is (or is defined as) that positive driving force which causes natural resources to be fabricated, workers to labor, capital to be invested; that force which creates industries, agriculture and other enterprises, that man may be elevated to higher ideals; the promotion of the arts and sciences, and of culture and knowledge, that a higher standard may be realized by mankind.

That force with proper economics, initiative and ideals creates that development of industry and commerce which allows the worker to enjoy the fruits of his labor, the engineer the opportunity to express his creative efforts, and the investor to realize a fair return on his invested capital.

Without Management to distribute the results of labor and materials effectively, the performance may become so uneconomic as to cease entirely. Management is a part of every activity having responsibilities from the newsboy on the street to the great function of government.

The engineer has been responsible for a major part in the progress of mankind, and particularly during the last decade. The greatest progress has been made in industry during this time due to the application of engineering principles to management.

The inception of industrtial engineering occurred back in 1878, when the metal industry realized the possibilities which were available by the utilization of scientific management. Engineering principles were applied to management during the years between 1878 and 1895 in some isolated cases, but the greatest impetus was given to the movement by the efforts of the late Frederick W. Taylor, who at that time presented a paper before the American Society of Mechanical Engineers on a wage incentive system. His paper was outstanding in the industrial field, and aroused the attention of management and the engineering profession. Since that time many engineers have become identified with the move-

ment, but the birth of the industrial engineer really occurred in 1878.

The utilization of these principles has been responsible for a major contribution to society; because of mass production, physical effort has been transferred from the individual to mechanized industry, and has increased the production per man hour many fold. Unleashing long hours of toil and strife has resulted in a greater participation of the worker in the earnings of the institution and distribution of the finished product to the ultimate consumer at a much lower cost.

Management has functioned in connection with industrial problems in many forms. The Guilds during the eleventh and twelfth century represent fine examples of management. When the craftsmen of old created a group under the leadership of a master, who governed the group, industrial progress was created and such organization in general has continued up to the present era.

Engineering Principles Applied to Management

The engineering mind was applied to industry from a managerial angle following the efforts of Mr. Taylor and several others, but the greatest strides were made during the late war, when the extraordinary requirements facing industry gave the engineer the opportunity to develop scientific principles in the operation of an institution.

We can realize the development to a greater extent if we refer briefly to the automotive industry. I fully believe that if the use of engineering principles had not been employed in this industry, many would not be enjoying the privilege of the ownership of a motor car, which is a result of the low costs effected.

The printing industry in the rank of industries, as to the value of manufactured products, stands fifth; this includes printing and its allied trades. Printing and publishing together with paper making stands first. It also stands first in the number of establishments.

The printing industry is one of the oldest and has made one of the greatest contributions to mankind, whereby the printed word enlightens the masses, and brings the happenings of the entire world daily to the individual. The mechanization of the function of printing had its inception at the time Guttenberg invented the

use of movable type, and the problem of management and production, as it concerns the printer, was created at that time.

Fundamentally the process of printing remains the same—the utilization of a mechanism, physical effort and raw materials.

The automotive industry is less than 30 years old, but it has during its short life made far more progress than the printing industry in its hundreds of years of existence considering production, volume and low cost.

The Graphic Arts, down the annals of time, have given to the world many achievements fostered by tradition and craftsmanship. The artist has expressed his creative ability with pallet and brush; the printer has also developed an art that is synonymous with his brother artist; with his type and color harmony he has created reproductions that are masterpieces. In this way a craftsmanship has been created that is cherished and guarded by tradition.

Have we in the printing industry had an opportunity to take advantage of modern methods and engineering principles in the management of our shops, or have we allowed our ego to place us on a pedestal elevated by pseudo artistry in our desire for an ideal; and in doing so allowed our brethren in other trades to precede us in industrial development?

The automotive industry had one advantage, however, in that it was created within the last 30 years, and had the opportunity to absorb all of the improved methods which had been developed during the last 200 years, and did not have processes established by tradition to overcome.

One of the reasons for the success of the automotive industry is the rapid turnover of invested capital—one division of one of our large corporations enjoys the privilege of turning its capital over 17 times in one year.

In our field we have been somewhat reluctant to adopt modern management methods, possibly because we did not have the opportunity, or perhaps because the printers usually have been carried along on the tide of American prosperity partly due no doubt to the mushroom-like growth of advertising. We are made up of a large number of small units, which is the reverse of our automotive friends.

The industrial engineer has a place in the printing industry, and I am going to present facts for your information demonstrating that point.

In this reconstruction and deflation period many institutions are suffering from low business volume, and serious competition in the progressive lowering of commodity prices. Every effort is being made to reduce costs and still make a profit. Capital invested in an industrial institution requires twice the return that capital demands from real estate or other enterprises.

I made the statement that one branch of a large industry has a capital turnover 17 times per year, and it is common in general practice to turn over five to six times. Ratios for printing management for 1930, representing about 500 establishments, show a composite ratio of sales to net worth of 175. This demonstrates the possibility confronting our industry of increasing our capital turnover materially, resulting in a much lower unit cost.

The establishment of definite ratios for the control of a business is an axiom, and the excellent work performed by the United Typothetae in the field is commendable. One of the most important ratios for the management to consider is the ratio of sales volume to net worth. This reflects the sales activity of the invested capital and measures the activity of the money which the owners and directors have at risk in the business.

With the proper turnover of capital together with the establishment of satisfactory ratio of liabilities to assets governing working capital, reserves can be set up covering depreciation, obsolescence, safety and welfare of employees' superannuation, operating reserves (when assets are tight), proper insurance, research, foremen's training, apprentice training, and many items which have to be considered. The large differential in prices, where better methods are not involved, can be attributed to the conditions whereby consideration has not been given to these ratios when prices were established. This results in economic distress and industrial disaster during times of low business volume.

Referring to the United Typothetae report for 1930, we learn that out of 419 firms 64.3 operated at a profit, while 35.6 operated at a loss; 247 firms, or 59% failed to earn even a banking return of 6%, while one out of every three operated at a loss.

Ratio of Invested Capital to Volume

From my viewpoint one of the greatest factors involving the manufacturing costs in a printing plant is, first, the ratio of invested capital to sales volume. Due to the nature of the business it is necessary to operate units requiring a large investment per unit, and the ratio of productive machine hours, including make ready, to standard or budgeted paid hours is too great. Usually the efficiency does not exceed 60%. The remaining 40% represents a distinct loss on invested capital.

Obsolescence

Naturally a great many variables are encountered in the management of a printing institution due to the nature of the job, and engineering principles are required to make a satisfactory analysis to salvage this loss. On account of the capital investment the owner is reluctant to modernize equipment by replacement at the proper time, and obsolescence is inevitable.

Obsolescence is a factor that has been a problem of management and no doubt has been given less consideration than the other factors involved. However, it is the cause of more business failures than we realize. The printer who purchases new equipment when he creates an institution faces this factor and bases his prices on the proper depreciation, obsolescence and reserves commensurate with good management. It is his duty to replace his equipment in accordance with the development and improvements in the trade. Failure to do this at the proper time is a very serious mistake, and the law of diminishing returns, one of the great economic laws, will soon present a condition that will no doubt require the owner to issue bonds or secure a loan at his bank to finance the replacement of obsolete equipment.

The reverse of this condition occurs many times when individuals create an institution and in doing so purchase used equipment. In setting up their rates, usually due to the lack of experience, they fail to consider this important point. In their case obsolescence is the first consideration. If their rates are not properly set up when the time arrives to replace, they too will not have any reserve to provide for the purchase of replacement equipment. This results in unfair competition. When replacement time arrives it

will be necessary to raise prices. Many examples do we find in industry involving this economic crime.

It has been said that any superintendent or manager of an institution who has under his supervision equipment which has passed beyond the critical or obsolete point, should be held responsible and accountable rather than praised for being conservative.

Managers and engineers have focused their attention on the subject of obsolescence in many branches of industry, and are setting up a definite plan covering a period of years whereby replacement will function at the proper time. One organization has set up a unit measurement, which by proper statistics and records will determine the critical point.

The factors to be considered in regard to equipment replacement are as follows:

A—Cost of improved machinery
B—Resale or trade—in value of old machinery
C—Cost of changeover
D—Cost of repairs
E—Cost of overhauling
F—Net cost of improved machinery

$$F = A - (B\text{-}C \text{ or } D \text{ or } E)$$

I will quote Floyd W. Parsons in regard to "The High Cost of Obsolete Equipment": "A recent survey disclosed that 50% of all plant equipment in American industry is obsolete. This is largely the result of continual improvements in mechanical designs of every kind.

"Equipment obsolescence is holding back trade recovery by causing higher costs and lower profits. Better machines help industry by increasing the output per wage earner. They help the worker by increasing his pay and his leisure.

"The obsolescence and depreciation of machinery should be treated in very much the same way. The life of a machine or tool should be forecast when it is purchased and its cost should be amortized annually. The amount of this amortization should be deposited in a fund and held for its purpose."

Engineering Methods

Lord Byron has said: "Time that is past thou can'st recall; of

time to come thou art not sure at all. The present only is within thy power, and therefore, now improve the present hour."

It has been the opinion of many that modern management and the adoption of wage incentives, production control and the many phases of this subject do not apply to the small organization.

I will answer that by stating that the small printer can also systematize his plant and employ modern methods in the proper ratio.

The metal industry faced the same problems which confront us, and that is the question of converting an industry founded on hidebound tradition and craftsmanship to modern management. They have accomplished this and have done a fine job. In the application of wage incentives to this type of a plant the industrial operators can be placed on one type of incentive and the craftsmen can be placed in a special group. However, no employee, whether he is a craftsman or what not, will strenuously object to any system if it improves his condition and increases his earnings. The craftsman can be placed on a special bonus.

The publishing and newspaper group have been a mass production center for many years, involving long runs and large volume. It would be necessary to consider their problem from a different angle from that of the lithographer or small printer concerned with short runs and small volume.

The various finishing operations in lithographic letter press, printing and publishing organizations are more or less synonymous, and most any of the task and bonus systems, or group bonus, could be applied. There are many systems, such as the Halsey task and bonus, Bedaux individual bonus, Mannit and similar types. Due to the resultant low cost of clerical work for record keeping the group bonus plan is becoming quite popular, due to its simplicity. The conventional bonus system requires an inspection operation to control quality.

In connection with the operations involving craftsmanship a different application would be necessary: First, the craftsman would control his own inspection and would be required to control the quality of his work, depending on his good will and integrity. Individual, or group bonus, can be applied to this type of work with proper consideration.

Frederick W. Taylor was the first to outline the true principles of scientific management, and it was the greatest advance since

Tubal Cain. His principles were published by Harper Brothers and were within two years translated into French, German, Dutch, Swedish, Russian, Lettish, Italian, Spanish and Japanese.

His development is a chronicle in industrial history and is defined as follows:

1—The development of a true science
2—The scientific selection of the worker
3—Scientific education and development
4—Intimate, friendly cooperation between the management and the worker.

The engineer has been accused of playing a major part in our unemployment situation by the mechanization of industry. Let us consider this accusation in all fairness: Taylor's work was started in 1880, and in the beginning of real development in machine tools was also in 1880, yet the gainfully employed in industry in the United States increased one and a half million from 1880 to 1890, which was greater by 100% than any previous decade.

Taylor's Methods

Some excellent work was done prior to Taylor's efforts by Henry Gantt and H. R. Towne and some others to overcome the defects of the piece-rate system, but his development revolutionized the principles which heretofore were standard practice.

The fundamentals of management founded by Taylor consist of a careful study of the elementary operations involved in the production of an article. These elementary operations are classified, recorded and indexed by means of the data available. A job is divided into its components and standard times set up. Summing up these standards, the time required to perform the job is found, eliminating guess work, such as existed under the old piece-work system.

The differential rate system created by Taylor established two different rates for the same job. A high price for the work done in the shortest space of time, and a low price where the operator's performance was low, or what was considered standard. Further, the low price prevailed, provided the quality of the work was imperfect.

Under this system the worker was encouraged to increase his

earnings with the knowledge that the rates were established on the basis of a proper analysis and would be maintained. Under the old piece-rate system the worker was afraid to increase his earnings because rates were cut when production was greatly increased. This system was based on permanent antagonism between employer and employee. The ordinary piece-work system involves a permanent antagonism between employers and men, and a certainty of punishment for each workman who reaches a high rate of efficiency. Under it the best workmen were forced continually to act the part of hypocrites to hold their own in the struggle against the encroachments of their employers, and the worker controlled his own production at a much lower point to protect his earnings.

Taylor's method was a true wage incentive system, promoting higher efficiency, better quality and a maximum quantity of work. But the most important asset was the creation of a much better understanding and confidence between employer and employee. Taylor's system was directly the opposite of the piece-work system, both in theory and results, paying a premium for high efficiency, promoting the best quality and maximum quantity of work.

The system consists of three principal elements:

1—An elementary rate-fixing department
2—The differential rate system of piece work
3—What is believed to be the best method of managing men who work by the day.

Fundamentally, wage incentive systems function the same at the present time, except certain refinements which have been made in recent years. One fundamental fact brought out by Taylor which has been recognized is this: "Men will not do an extraordinary day's work for an ordinary day's pay."

Direct and Indirect Labor

Direct labor, or *productive labor* is that labor which is concerned with the actual handling of the product itself, and is a variable factor running in harmony with the variation in the volume of business, like direct material cost, such as ink, paper, etc. It comprises a major part of the manufacturing cost. Direct labor is an item of cost usually considered first in adapting a wage incentive, and the control of this factor is realized.

Indirect labor in manufacturing, or *non-productive labor* is necessary for the operation of an institution and involves salaries of inspectors, supervisors, office force, foremen and minor executives. A certain firm building highly specialized technical instruments has recently changed their method of cost distribution of their engineering and experimental department, whereby cost of development is distributed directly to the selling price instead of an overhead charge on manufacturing cost applied to all products. This is cited as an indication of the recently developed trend in accounting practice toward the elimination of indirect labor.

The subject of indirect labor is one which concerns management at this particular time, and a careful analysis of manufacturing costs is in progress in every well managed plant in these days of readjustment. With a proper installation of modern methods based on analysis and engineering principles, the proper ratio of indirect or non-productive labor to direct, or productive labor, will be established. This will be a true measurement of the indirect labor necessary for proper inspection and operation of a plant.

In the control of direct and indirect labor, the fundamentals of organization are four-fold: first, the purpose and objective of the institution; second, the establishment of definite lines of supervision; third, the placing of fixed responsibility; fourth, consideration of the human equation.

Any well managed institution should have a satisfactory organization chart, so that definite lines of responsibility can be established. The line and staff organization has many advantages over the functional and military types, and is very popular at the present time.

Our industries for many decades have functioned under the supervisory system, and we relied on the supervision of the foreman or other executives to assure management that the worker was producing a standard task resulting in an expensive system requiring an unnecessary amount of indirect labor. Management utilized the old piece-work system to stimulate greater production on the part of the worker. This was not popular for the reason that past performance was used as a basis of measurement of effort.

The supervisory system depends on the foreman and his good judgment together with his ability to suggest better methods and

reduction in lost time. The worker did not have any appeal to stimulate his imagination and creative ability, consequently much valuable effort was lost.

Plant Layout.

Plant layout not only concerns the new plant which is in development, but it also involves the plant which is in existence at the present time. In designing a new plant the buildings should be so arranged that the raw material will be received at one end of the institution and the finished product delivered from the last operation at the other end.

The receiving point should provide ample storage for the proper amount of raw material consistent with the inventory control in use. If air conditioning equipment is available, this will be a great asset, resulting in a reduction of lost time in the press room and better quality. The incoming paper should be received on skid platforms provided for handling by tier lift electric trucks in the large plant, and by hand trucks in the small plant. Paper received in rolls can be handled by special electric trucks.

The raw material should be delivered to the press room on skids according to schedule boards and proper move orders. The skid loads of paper should be arranged ahead of each press, parallel with the press feeder to eliminate unnecessary re-handling and back lash. This systematic procedure should be followed from the time the raw material is received until the final operations are completed ready for shipment.

A straight-line flow of goods-in-process should be the ideal, and this can be accomplished with reservations in most any plant, with some readjustments and minor alterations depending on conditions.

Proper flow of goods-in-process will automatically reduce indirect labor and reduce manufacturing costs. The machinery should be arranged to eliminate rehandling of materials, and for the convenience of the workers.

Every consideration should be given to the welfare of the employees. Ratios for printing management for 1930 state that 74.4% of the cost of printing concerns factory operating cost, and of this labor represents 29.9%. This investment is a large item of operating expense, and the greatest return on this investment should be realized. Recently a new windowless plant was designed and

erected, in which every consideration was given to illumination, ventilation and sanitation for the welfare of the employees. If we expect a maximum production for our expense dollar, healthful and pleasant surroundings should be provided.

It is costly to have products which are being manufactured retrace their steps through the factory building. It is also expensive to utilize buildings having many floors, where it is necessary to transport heavy products for manufacture up and down. Millions of dollars worth of materials are unnecessarily handled in American industry which could be avoided.

Factors that govern plant layout are size and type of factory building, location, balance of departments, internal and external transportation, heat, light, power, ventilation and future expansion.

Plant Layout Purchasing

The purchase of equipment is an important item to consider in connection with plant layout. Many times the investment for unnecessary equipment could be avoided if management gave proper attention to market analysis, prospective sales volume and proper layout of equipment. Systematic arrangement of operators and machines is necessary for maximum machine activity and low investment. It is at this point that a proper control over the ratio of invested capital to sales volume can be exercised.

In the purchase of equipment, standard types should be considered having the greatest trade-in value, when replacement at the proper time is necessary.

Standardization

The importance of standardization can be appreciated by a single illustration.

Consider the inconvenience which we would realize if the different railroads had not adopted a standard gauge. Modern transportation, as we enjoy it today, would not be possible. Methods, machine processes and materials should be standardized. The program is a very important function of operation and many factors are concerned.

Considerable work has been done to assist the printer in this regard by the standardization of printing paper.

Inks have been standardized to a great extent by the Letter

Press Printer, but the lithographer has failed to consider the advantages of this important point to the extent that he should. However, the Letter Press Printer has set an example which is receiving the attention of the lithographer, and progress is directed toward this field. Standardization makes our equipment versatile and promotes interchangeability. In the purchase of equipment it is very essential to buy standard machines which permit interchangeability of parts and low inventories, use of standard paper sizes and the various supplies and materials used in manufacturing processes. Standard pre make-ready where considerable preliminary work can be done at man hour rate, eliminates extra machine-hour time in the press room.

Operations should be carefully analyzed and standards set up for these operations. This will allow the development of standard costs, which is a great asset in the operation and control of a business.

A standardization program covers buildings, equipment, fixtures, materials, tools, operations, inspection and costs.

Scheduling

To apply engineering principles to the graphic arts without proper scheduling and planning would be comparable to the installation of a press without all of its parts.

The issuance of orders from many sources in a chaotic manner is a source of unnecessary expense and should be eliminated.

In the operation of a modern scheduling system, the work is systematically routed to the effect that all equipment is utilized to its maximum capacity, and costly delays of machine operators waiting reduced.

Scheduling production provides for the establishment of beginning and completion dates for each manufacturing order, for the control of the processing of that order so that it will mature on the date promised. Pre-determined schedules control the operations of the offices of train dispatchers on our railroad systems, so that express, limited, through freights, local passenger, and freight trains may use the same tracks effectively.

The adoption of this plan by industry involves practically the same elements. There are the regular scheduled orders, each of varying importance, and there are special orders for urgent deliv-

ery, which cause interruptions and special conditions to be met. Proper scheduling controls systematically the flow of goods-in-process with proper adjustments in accordance with promised delivery date.

The printing industry is essentially one which in nearly every instance manufactures to customer's order rather than to stock; each order is a unit in itself, from the creation of the subject by the artist or compositor through the manufacturing operations to the shipment of the finished product, and runs in multiples of thousands.

It is customary to use a master schedule which indicates the relative importance of manufacturing orders. The arrangement of the production schedule should be in charge of the manufacturing order department, and careful cooperation with the sales department should be maintained, so that information as to delivery may be considered.

On account of the nature of the business in the printing industry, a schedule board is a satisfactory medium for presenting in detail the time of starting and completion of each edition for each operation. This can be set up in hours per machine, and shows at all times the status of work-in-process, and it can provide for one, two or three months in advance as necessary.

This should coordinate the sales, manufacturing and shipping departments, so that a continuous flow will be realized without interruption, and a minimum inventory of materials, both raw and semi-finished.

Control of Inventories

The business survival of an industrial enterprise may readily rest upon the effectiveness with which it controls its inventories. The goods in stock and in process partly finished usually represent from a quarter to a half of the capitalized value of the business. Proper purchasing through budgeting and inventory control is the means for providing the material when it is needed, and will eliminate the possibility of tieing up capital which might be used in promoting the business in various other ways. Coordination of purchasing with manufacturing stands between financial success and failure.

The proper function of an inventory control will provide the

proper amount of raw material at the right time, and of sufficient quantity to prevent lost time in manufacturing operations, and at the same time prevent the investment of working capital in excessive quantities of material which might be wasted or become obsolete.

Wage Incentives

The most important relation between employer and employee is that of wage payment, and in order that proper relations exist, the basic wage must be right. This has been a controversial subject for many decades, and our industrial history contains many chapters which are colorful in industrial misunderstanding and suffering.

The lower the wage or inherent power which flows through the organization, the less developed power may be expected in return.

The old day-work system, which is the oldest method of wage payment under our present industrial system, no doubt is the form of wage payment used in a large percentage of our plants today. A wage incentive system depends upon a careful time study and analysis of the operation as a basis of wage payment. A time study by a trained time study engineer does not deal with yesterday. It is not a mere record of today's performance, but a scientific analysis of the possibilities of future performance. He is not necessarily a trained operator, but his analytical training enables him to determine the true value of elementary time. Though unaccustomed to the job he has under analysis, oftentimes he can after analysis excel the operator in performance.

There are a number of different systems of wage incentive and each has its merits. All premium plans of wage payment arrange to give the worker some share of the saving effected in the cost of production. The Halsey Premium Plan basically sets up a standard predicated on past performance and divided with the worker a portion of the time he saved—usually this was divided equally between employer and employee.

Some systems employ a time study and task, wherein the task or standard time is set, and the worker is paid a bonus for production exceeding the task. In other cases the task is set higher and the worker is paid a bonus for reaching the task—in either case the ultimate results are practically the same. The task and bonus sys-

tem has advantages, and if the task is accomplished the company will receive a definitely known minimum output at a lower cost per unit. The task, of course, is determined after job analysis has disclosed the requirements of the work and conditions covering its requirements.

Two major advantages are gained by the task and bonus system of wage payment: first, its beneficial effects in cost determination and its influence on selling price; second, the possibility of scheduling work in process of manufacturing and production control.

The Bedaux, Mannit and other systems are based on careful study of human effort, and their standards are set up on the result of that study. The task, or standard, is the so-called B Hour, or "B," and in the Mannit system the Mannit bonus is paid on individual efficiency—usually on any production over 60 B per hour.

The individual bonus system requires more clerical work to record performances, and in order to reduce indirect labor group bonus systems have become popular.

In straight-line production a group standard is set up and the group is paid a bonus pro rata according to differential hourly wage rates for the production over standard at the end of the line.

In the printing industry, group bonus systems of wage payment could be readily applied to the press room in several ways: first, as an individual press group based on press activity or production in impressions per day or per hour, the bonus to be paid on production over standard, allowing for standard make-ready; second, it could be set up to cover the entire press room based on press activity. This type of system would reduce the cost of indirect labor to a minimum.

In the finishing operations, most any of the conventional systems could be applied, these operations are more or less synonymous and are simple in operation, individual or group bonus, depending on the operation where machines are involved, which require three or more operators, group bonus can be utilized.

According to ratios for printing management for 1930, wages were responsible for 28.57% of the sales dollar, and the composite net profit was 7.17%. It has been proven many times that wage incentive decreases labor cost 20%, hence a wage incentive for

this period would undoubtedly have added 5.75% to the earned profit.

If more than a third of the printers operated at a loss in 1930, do we want to continue to use past practice as a basis for estimates? If some of the big job possibilities for 1931 were lost to a low bidder, do we still want to use past performances as a criterion of future earnings of your invested capital?

It was thus that Henry L. Gantt when analyzing and standardizing a certain job, was able to determine more and better work with 35 girls working 8½ hours per day than with 120 girls working 10½ hours per day for which they were also better paid.

The Western Electric Company have successfully applied incentive to their store room, in which is handled 110,000 different parts and 18,000 kinds, shapes and sizes of raw material.

Many interesting installations have been made resulting in low labor cost and increased production.

Budgets

I believe that a budget control, to be effective, must be based on short periods of time. The control of the four fundamentals of business determines the profits of the enterprise. The four fundamentals are classified: first, the purchase of the raw material; second, the fabrication of that material into the finished product; third, sale and distribution of that product; and last, the financing of the institution.

The budget principle in business implies planning and forecasting and developing plans whereby the operations of business will be coordinated and operate as a unified whole.

Budgets concern a careful consideration, item by item, of the functions of a department for the purpose of control of cost items, which are predicated on estimates which pre-determine the items of expenditure. This makes possible the recognition of leaks and the control of assets which might be expended for enlargement at the wrong time.

A budget is the means of establishing a sound financial program. Bankers are demanding more information of operations and programs than formerly. They are interested in lines of prospective operations as well as balance sheets—they want to know when loans which they have made will be paid.

Reserves

Many plants are in existence today operating equipment which is 20 and often 30 years old. If this has been properly depreciated it should have been discarded years ago. I am afraid some of these plants have not set up adequate depreciation reserves and re-equipment will be a serious financial problem.

A proper depreciation reserve should be established and maintained so that it will be available when replacement becomes necessary. Very often the depreciation reserve is not available when required—it has been used for dividend purposes.

Obsolescence reserve is analogous to depreciation and should be provided for. Possibly with proper consideration these could be combined. Reserves should also be arranged to provide for superannuation, proper insurance, research, foremen's training, apprentice training, safety and welfare of the employees and the many items which have to be considered.

With the absence of these reserves when the occasion arises whereby it is necessary to cover some emergency, the management is unable to cover their liability.

By the creation of operating reserves, business expansion is stimulated and the proper return on invested capital is assured.

In conclusion, I maintain that the printing industry should modernize. I maintain that many plants are operating at a loss today due to improper consideration of the fundamentals of management that would realize a profit if engineering principles were adopted. The engineer, in cooperation with management, has a definite responsibility in the fabrication of raw materials and in the sale and distribution of manufactured products, that materials and labor may be utilized effectively and efficiently.

Industry is under a distinct obligation to society for the control of the various factors which govern the efficient utilization of our natural resources in order that exploitation does not exist and that future generations may enjoy these resources. Further, we are responsible for the control of the stabilization of the material and physical forces to prevent human suffering and poverty.

The engineering profession has been challenged by society with the responsibility of creating unemployment by the mechanization of physical effort, when in reality the economist has failed to fol-

low the progress of the engineer in developing his inventive genius. It is a possibility that in the process of stabilization the engineer will pay a major part. The Printing Industries Division of the American Society of Mechanical Engineers is facing a golden opportunity. By the processes of analysis and science the best interests of the entire graphic arts can be elevated to a higher standard. Our sister industries have paved the way, their efforts have been an experimental laboratory in the field of industrial management. Let us profit by their experience and lead the way to a higher sphere.

The engineer has a definite responsibility in coordinating the activities of various branches of the arts, but on a broader scale. Heretofore the engineer was reluctant to deviate from the development of science as it was applied to the many functions of industry, but if we are to make progress the engineer faces a new responsibility, and that responsibility is economics.

Industrial economics is a function of engineering and under the guise of industrial engineering has been a part of our industrial responsibility for a decade.

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REPORT ON A SURVEY OF THE REVALUATION OF PLANT ASSETS

By the Research and Service Department,
National Association of Cost Accountants

A RECENT survey conducted among our members by this department has revealed some very interesting facts and tendencies. To date we have received 135 replies to the following questionnaire which was published in Section II of our January 15, 1933 Bulletin:

QUESTIONS:

1. Do you think the writing down of fixed asset values a sound policy at the present time?
2. To what values should such fixed assets be written down:
   a. Present market value? b. Net sound value?
   c. Other? (Explain).
3. Has your company written down the value of any of its fixed assets in the following groups:
   a. Assets now, or expected to be, in use:
      (1) Buildings. (2) Machinery and Equipment.
      (3) Other (Explain).
   b. Assets not now, nor expected to be, in use:
      (1) Buildings. (2) Machinery and Equipment.
      (3) Other (Explain).
4. What account was charged with the amount of reduction in fixed asset values in your company?
   (You may use the other side of this sheet for additional remarks)

Your name .....Position.....
Your company .....Address.....

Because of the interest in this subject at the present time we hoped that more of our members would respond so that the report might cover more companies in a wider variety of industries. However, the responses which we have received perhaps reflct rather accurately the general trend in the present movement toward the revision of fixed asset values. Perhaps they also contain most of the main arguments which may be advanced for or against the

policy of revising the balance sheet accounts at the present time. On the next page is presented a summary of the replies received. Since the replies came from two distinct types of members, they have been summarized under two groupings. Group I consists of those who are employed in commercial or industrial organizations which have investments in plant and equipment, and Group II, those who are not so employed, such as public accountants and others. Naturally, the replies from the members in Group II reflect only their personal opinions, based upon observation and experience. No doubt the same is also true of many of the replies from members in Group I. However, since many of the replies in Group I come from chief accountants, auditors, controllers, and the executive officers of companies, undoubtedly they reflect, in many cases, the policies of these companies. Approximately 73% of those in Group I favored some revision of asset values, and about 75% of those favoring revision advocated the use of "Net Sound Value." However, it is interesting to note that only about 54% of the companies in which they are employed have made any revision in asset values. Of the 117 companies represented in Group I, only 46 companies, or about 40%, have written any of their assets down. Thirty-five of these companies have reduced the book values of assets now or expected to be in use, 33 have reduced or completely written off the book values of assets not now nor expected to be in use, and 22 have written down the values of both types of assets.

There are some interesting replies and comments relative to what account was charged with the amount by which certain assets were written down. In 27 cases earned surplus was charged, in 13 cases capital surplus was charged and in 6 cases various other accounts were used, the main one being current profit and loss. One member replied that in his company the write-down of fixed assets was charged to goodwill.

While the majority of these replies are from men who favor some revision in asset values, only a few of these stated their reasons for being in favor of this policy at the present time. On the other hand, most of those who are against such a policy stated their reasons for being opposed to it. We are taking the liberty of publishing some of these replies, without revealing the members' names nor the names of the companies they represent. Only a

SUMMARY OF REPLIES TO QUESTIONNAIRE,
"Should Asset Values Be Written Down?"

Group	Description of Group	Replies from Group I	Replies from Group II
I.	Members employed in commercial and industrial organizations	117	
II.	Other members, such as public accountants, etc.		18
III.	Those against policy of writing down asset values	32	6
IV.	Those in favor of policy	85	12
V.	Those who think assets should be stated at:		
	a. Present market value	13	4
	b. Net sound value	64	3
	c. Some other value	9	6
VI.	Companies in which assets have been written down:	46	
	a. Group (a)	35	
	b. Group (b)	33	
	c. Both Groups (a) and (b)	22	
VII.	Companies in which assets have not been written down:	71	
VIII.	Number of those in favor of it whose whose companies have not adopted the policy	42	
IX.	Those who have reduced asset values have charged:		
	a. Earned surplus	27	
	b. Capital surplus	13	
	c. Some other account	6	

relatively small number of them are given here but it is felt that they are typical of all of the comments which were made. The comments and the types of organization in which the members are employed are as follows:

TYPICAL REPLIES TO QUESTIONNAIRE "SHOULD PLANT ASSET VALUES BE WRITTEN DOWN?"

Office Equipment Company

"I have been reading a lot about this subject and have also had representatives of appraisal companies and accounting firms call on me regarding this activity. Frankly, I feel that it may be a good practice in some concerns where the writing down of the capital assets would mean a real saving in future earnings and, also, provided they had a large enough surplus to withstand the write-off without jeopardizing their surplus account to too great an extent.

"I feel that it is a point to be considered carefully whether you wish to take a large loss at the present time or whether the same loss should be taken over a period of years through depreciation, as you take the loss in either event.

"Where selling prices are based on competition and market conditions, I see no value in taking this loss at one time. Where prices are set according to costs, it may be a logical procedure. We have had many discussions in our company regarding the feasibility of taking this action, but the savings in depreciation are not worth it.

"Some people argue that it will also save on your insurance cost. I do not believe this as you do not insure for book valuations but replacement valuations, and you can adjust your insurance coverage from year to year on this basis. If it is not feasible to write up your book assets in prosperous times, then it seems no more logical to write them down in depression times.

"If such a write-off were made, I believe it should be made through the surplus account, especially in concerns where the stock is widely held, as it is not fair to penalize present stockholders for the benefit of future stockholders."

Ball Bearing Company

"I do not think the writing down of fixed asset values a sound policy *at the present time* because, except in certain unusual cases, it would be a recognition that values under existing conditions are normal. It is significant that the present popularity of "writing down" schemes is due to a desire to justify selling prices which without this subterfuge would be generally lower than cost. Furthermore, the plants which recognize the theory of replacement values will not usually adopt the practice of actually replacing the equipment with a more modern type which would result in an honest lowering of cost. If one is to accept the theory of writing down assets to a replacement cost level, why not follow the theory entirely through to its conclusion and value all inventories at a replacement cost which includes lower unit costs of labor and materials from increased efficiency of new equipment. In my opinion, that would represent a more honest replacement cost than that which partially eliminates depreciation cost and ignores other elements of more significance from a real economic viewpoint."

Air Conditioning Company

"The writing down of fixed asset values is a sound policy at the present time. There is no question but that our assets are greatly inflated, and that in order that manufacturing plants may produce products truly representative of today's values, it is necessary that we revalue all of our accounts to place them into conformity with today's replacement values.

"Fixed assets should be written down to the present market value.

"Our company has written down its assets to what we believe to be today's market value, and idle equipment has been written off entirely.

"The surplus account was charged with the write-off of these assets, but we likewise applied a credit to the surplus account for the proportionate reserves for depreciation and amortization representing the write-down of the fixed assets."

Ice Cream Company

"Not all companies in our industry have excess values on their books and as a result excess fixed charges, but many of them do.

"While of course considerable writing down of assets is due to the general decrease in value since 1929 and some to poor planning or plant designs, except in the case of consolidations, as I see it there are two main reasons for writing down fixed asset valuations which overshadow the two preceding ones, namely, overcapacity and obsolescence.

"In the main those companies in our industry who are worrying about the plant or equipment valuations, and of course, consolidations are excepted, are companies that even in 1928, 1929 and 1930 had more equipment than they actually needed. I do not know of one single company that built in those years that did not provide in their actual plant for the additional business they expected to get later. By this I do not mean that their buildings were constructed so that additions could be made but their building was built large enough so that the part in actual use, with no alteration, could handle a great deal more than the largest production they ever reached. Because of this, much of this building, and often equipment, although in use,

is not necessary for actual needs now and may be entirely obsolete before it is needed.

"The probable time that a piece of equipment can be used before a more efficient piece of equipment is perfected to replace it grows shorter each year. As some people say, 'Our scientific future is now about three to five years compared to ten or even twenty or fifty years just a short time ago' Because of this it is my opinion that depreciation charges should include a generous allowance for obsolescence, or an allowance for obsolescence should be set up separately.

"What difference does it make where charges for such decreases in value are placed as long as the capital and surplus accounts eventually are reduced by them? In regard to obsolescence: it should be a charge against operations for each accounting period. A charge for overcapacity is different. Our realization that it is necessary comes suddenly, not unlike a fire loss or other so-called 'disaster loss.' Why not then handle it as we would either of them—by a special charge to surplus?

"All industries have suffered losses through obsolescence and I can see the possibility of similar losses in the future. In other words, our guesses in the past have been wrong. Why not guess at obsolescence? We couldn't be any more wrong in it than we have been in other guesses."

Public Accountant

"Rather than write down the fixed asset values on the books at the present time, I would advocate a debit to Surplus and a credit to 'Reserve for Estimated Shrinkage in Replacement Values.' It seems fair to assume that we are on the eve of marked improvement in industry activity. If a direct mark-down is made of fixed assets, the chances are that within the next few years, under a similar course of reasoning, it will be necessary to resort to a mark-up. If every time we have a slump we mark down our fixed assets, and every time we have a period of rising values we resort to mark-ups to reflect the appreciation, we shall have, as the cycle progresses, a very confusing state of affairs without any real advantage accruing therefrom. If, for the purpose of keeping operating costs in line with similar costs of companies in the same industry who have the advantage of being equipped with new plant purchased at

depression prices, it seems necessary to modify the depreciation charges against manufacturing or other costs, this effect can be attained by splitting up the depreciation charges into two controlling depreciation accounts such as 'Depreciation Chargeable to Operating' and 'Depreciation Chargeable to Adjustments.'"

Aeronautical Manufacturing Company

"Fixed assets should be written down to such a value that a normal return on the investment may be anticipated under estimated production conditions for future years. One way of doing this is to adjust depreciation so that it is no more in percentage of total cost on the estimated results of the next four or five years than it was in the normal period preceding the climax of the last boom.

"Our company has written off a substantial block of machinery, equipment and special tools. We expect to, in effect, make another substantial write-off as of December 31, 1932, by readjusting our depreciation rates on an arbitrary basis which, if worked backwards, would result in a plant valuation of such a nature that we can anticipate a fair return on the equivalent valuation during the next four or five years. Under this method, the book value remains at a higher figure and may later be reestablished in whole or in part in our operations by reversing the new depreciation policy.

"The first write-off above referred to was charged against surplus. Under the new plan, we accomplished the desired results by merely lowering our depreciation rates, partly on the theory that the actual depreciation is not as great when the factory is operating substantially below normal."

Thread Manufacturing Company

"As a general rule fixed assets should be written down, but this of course would depend to a large extent upon when the assets were acquired. If acquired towards the end of the war or post-war period, say from 1917 to 1930, the answer would be 'yes.'

"They should be written down to net sound value.

"Our company has not written down the value of any of its fixed assets, but provision has been made for doing so by crediting an account described as 'Capital Surplus A/c.'

"As to assets now, or expected to be, in use, inasmuch as more than 50% of our total assets were acquired prior to or during the war period, in setting our standards we have averaged cost over all. We are also interested in knowing what the actual cost is of bringing through our product without having it distorted due to write downs. This is the reason why, instead of writing down individual items, Capital Surplus A/c was used, and furthermore, it is inadvisable to write down individual items because it complicates matters from a tax standpoint.

"As to assets not now, nor expected to be, in use, all surplus buildings and equipment have been written down to present market value or less, and the difference between remaining book value and, say, present market value is being debited to Capital Surplus."

Printing Ink Company

"Whether the procedure of writing down the value of fixed asset values is proper depends on the facts in relation to the property and on the way in which the transaction is effected and disclosed. The following are conditions precedent to the adoption of such policy:

1. The reduction in value should be substantial.
2. The reduction in value should be permanent.
3. The reduction in value should be carefully determined by an engineering survey.
4. After such reduction the provision for depreciation should be sufficient to provide for replacement of depreciable assets, having in view current price levels.
5. The rights of senior security holders or creditors should not be impaired.
6. The transactions should be carefully considered by counsel to avoid legal complications.
7. The effect upon cost-plus contracts or in a case of public utilities, rate making problems should be carefully considered.
8. The possibility of distributing dividends as earnings, which are, in fact, a return of capital, must be carefully considered.

"The value to which fixed assets should be written down should be carefully determined by an engineering survey, which would consider the present market value of the various assets but would

not necessarily adopt that value if conditions indicated increase or decrease might be expected in the near future.

"Our company has not written down the value of buildings or machinery and equipment. A study is now being made to determine if such action is necessary or advisable. Should write downs be made, the advice of our public acountants will be followed, providing it is approved by our counsel. All such reduction would undoubtedly be charged to Depreciation Reserve until the amount reserved had been exhausted. The amount by which such reduction exceeds the reserve would be charged to either Capital or Earned Surplus. The executives have under consideration the proposal to reduce the stated value of no-par common stock in an amount sufficient to provide the capital surplus necessary to absorb the reduction in asset value not provided for by the depreciation reserve.

Chemical Company

"I do not favor writing down assets for the following reasons:

1. The last few years have left all of us in more or less a demoralized state of thinking and I doubt if we are in a position to form any worthwhile ideas for the future—we are too close to the debacle. Why should we base our plans on our future business on the gloomy present any more than on the very inflationery outlook we had a few years ago?

2. To my way of thinking, what's the use of showing our financial statements worse than we have to. It is equal to admitting our moral as well as financial bankruptcy, by admitting times will always be as bad as the worst. I further believe that any mark-down of our capital assets should be accompanied by legal changes which are the same as a reorganization or going through bankruptcy, at least in a limited form. We could only charge this loss into surplus, which, after our experience of the last few years, would result in deficits. Why add to the last few years' operation results other large losses (based on business 15% to 70% of normal)? Certainly no one knows the volume of future years. Why take up losses that may never occur, at least to the extent we now feel them to be? I am personally in favor of not crossing bridges until we come to them, then I feel sure they will not be as bad as we now believe them to be. If they are marking down book records will not really help. I am still of the opinion Americans will find a way

out to future success and happiness and it will not be by marking down capital assets."

Sheet Metal Plant

"I believe the writing down of fixed assets to a proper valuation basis at the present time is a sound policy.

"While a very good basis for present-day valuation is reproductive cost, I believe that, in most cases, other factors will have to be taken into consideration. I am one of those who believes that in the usual manufacturing company, the value of the fixed assets does have some relation to the current earning power of the company. Then, we will have to consider the factor of obsolescence due to over-capacity in the industry, loss of utility, and straight obsolescence due to improved practice involving new types of equipment. My answer to this question is for a company to consider basis for present-day valuation as present reproductive cost, adjusted by other factors enumerated above.

"Our company has written down the value of many of its fixed assets in Group B, that is, those that we are not expecting to use in the future. In fact we have actually retired many of these properties. Our problem on assets being used will probably be given consideration in the next year or two and proper action taken at that time.

"As to the account that has been and will be charged for the amount of reduction in fixed asset value, we, of course, will debit our Reserve for Depreciation for accrued depreciation on any properties that are retired or written down to a retirement valuation. The difference between the accrued depreciation and the book value of the properties less the residual value will be debited against Surplus.

"In writing down 'going' properties to a reproductive cost basis, we will, of course, have to debit against the Reserve for Depreciation the difference between the accrued depreciation on the present book value and that which it should be on the basis of new book value. The additional amount of adjustment of our asset will be taken as a debit against Surplus."

Auditing Company

"I believe that balance sheet items should be valued at the lower

of cost or market values. We insist on inventories being valued at the lower of cost or market values, why not the rest of the assets?

"In close corporations I have written down the value of the fixed assets and correspondingly reduced the surplus (if any) and/or the outstanding stock. In reducing the outstanding stock, each stockholder has turned in his stock pro rata, so that their holdings have not been affected in any way.

In these times of high taxation with assessments at every turn, it is necessary that values be brought down to a reasonable amount. Taxation is based on valuation, therefore valuation should be somewhere near the present market value. Income tax is not affected by the reduction because the assets are depreciated on the basis of cost."

Lithograph Company

"Whether or not writing down of fixed asset values is a sound policy, depends largely on circumstances. In the case of a 'boom time merger' when assets were restated to conform to 'rising market appraisals,' we would certainly say that the water should be squeezed out.

"I do not favor the use of 'net sound value' since this is a close approach to the old-fashioned idea of depreciating diminishing values, so that the amortization of an asset took 'forever and a day.'

"If a plant were written down to net sound value and a new depreciation rate established on this basis, the element of obsolescence might have to be reckoned with long before the plant or certain parts thereof could be sufficiently amortized by application of reduced depreciation charges.

"Present market value, or 'new replacement cost,' would be a more reasonable basis, in our opinion, since such a basis would put the business on a parity with new enterprises and provide a reasonable depreciation charge.

"We have adjusted but one group of assets, which is a relatively small part of our equipment. This was an item acquired with the purchase of another concern in 1928. At the time of acquisition, the premium on capital stock issued in part payment for the stock of the purchased company was credited to Capital Surplus. The write-off was made against Capital Surplus, since it had a direct bearing on the original transaction.

"Through the use over a long period of a conservative depreciation charge, this company is in a position where no write-down is necessary—other than that above mentioned."

Investment Company

"The plant assets of a going concern acquired during a so-called 'high-price period' represent managerial commitments and expenditures which, once made, are irrevocable and beyond recall. The useful life of such plants is not affected by the fact that, during later years, the same plant might be built for one-half or one-third of the original cost. Any attempt to reduce the cost of the plant products by writing down the cost of the plant through arbitrary charges to surplus is a form of self-deception, or worse. Once a plant has been acquired, the costs of the products of that plant, in so far as they depend upon the consumption of the plant over the term of its normal life, cannot be changed. The fact that such costs are high because the plant was acquired at a high price is a hard and unalterable fact that indicates either poor judgment in the original commitment, or a misfortune, common at the present time.

"Any manufacturing proprietor who reduces his plant down to what he thinks it ought to cost under present-day conditions is merely 'kidding' himself by trying to make it appear that his manufactured product is costing him less than it really has. It is childish to pretend that a plant has cost something less than it really cost, and thereby create a fictitious bookkeeping profit. Further, such action implies that our present sad state of affairs is to be permanent, and would represent an abandonment of any hope of recovery of plant values or business. Even if the depression lasted five years it would not justify the write-off of manufacturing plants which, presumably, will be part of a going concern over a period of twenty-five or thirty years.

"All of the current movement in favor of writing down plants against surplus can be traced as emanating from the self-interest of certain classes of persons, such as operating managers 'appraisal engineers,' and stock sellers. It is a common and human instinct among managers to strive to keep out of their 'operating accounts' all costs and losses connected with fixed assets. They like to see these charges placed against surplus, so that they can show a handsome 'profit from operations.' They are encouraged and abetted

in this idea by plant appraisers in search of fees, and by stock brokers who point with gusto to 'operating profits' and say little or nothing about the millions of dollars charged against surplus.

"Misfortunes or mistakes in building or buying plants are just as much a part of the operation of any business as are the direct current 'operating charges.' It is easy to juggle the books so as to show an operating profit of $1 and a surplus loss of $2. In such a case the proprietor has sustained a net loss of $1. Why should he try to deceive himself and others? Let the facts stand without being covered up; let the true operating costs and loss or gain appear; and let hope remain that, within a year or so, the tide will have turned, and then there will be real profits instead of fictitious ones."

Steel Corporation

"Utility value is the useful value of an asset. For example we have a machine tool which cost $15,000 and is so carried on our books. We only use it 10% of the time but have to have it in our business. It will cost $15,000 to replace it. We do not write it down or off, as the $15,000 is its utility value. If, however, we can replace this machine with another costing $10,000 which will do the same job, we write off $5,000 from the value of our present machine.

"Another example—we have excess plant capacity in the shape of a building used for a machine shop. We have no work for this, and expect to get along without it for several years. We are using it as a storage building and will write it down to the value at which we can put up a storage building."

Pipe Line Company

"Yes, I do believe the writing down of the value of fixed assets to be a sound policy. I think they should be written to present day reproduction costs. The reserve for depreciation, previously based on the original cost values should be reduced proportionately. The reduction in plant values and depreciation reserve should be shown separately on the balance sheet, as the old values would be used in determining depreciation allowance for income tax purposes. The net adjustment as affecting surplus would be shown as a separate item. The balance sheet revised in this manner would enable the investor or stockholder to determine the correct value per share of

the stock, by removing the non-existing values from the balance sheet.

"To write down assets would not be applicable to common carriers whose rate of return is regulated by governmental bodies. Particularly adaptable to manufacturing industries."

Meter Testing Equipment Company

"We believe this depression has brought forth no more amusing hoax, since the birth of Technocracy, than the idea that marking down capital assets justifies the lowering of selling prices.

"Between the lines of the attached questionnaire, we seem to read another presentation of this idea. At the risk of finding that our surmise is just another little error on our part, we submit the following:

"Experience teaches us that a proper selling price structure must include an analysis of all expenses incurred over a period of years for each line of product, culminating in a 'normal' for each component item and the total by amount per year, per cent of net sales, and cost per unit.

"For perfectly good business reasons, the authorized selling price may be quite different from the normal. It calls for no apology, nor for 'justification' by marking down any incurred expense.

"In developing this price structure our company permits no charge to surplus except through some account that has its place in the price structure. Therefore, unless the estimated life of an asset is changed, a mark-down on our books would make no change in the normal."

Pump and Tank Manufacturer

"Not only do I believe that plant assets should be written down to their present market value, but I believe: a. Idle plant should be written down and segregated physically as much as possible. b. That so far as it is possible by consent of the law, and stock or bond holders, such write-downs should be offset by contraction of capital structure—reducing number of outstanding shares of no-par stock, for example. In the case of railroads in receivership, the above mentioned 'consent' would be much easier to obtain. This would be deflation with a vengeance."

Laundry Company

"We have not directly written down our machinery values against Capital Stock, for our chief aim is merely to charge current expense with Depreciation on only the machinery in use. The normal depreciation on excessive values and on idle machinery is charged currently to a Reserve for Contingencies, which has been set up out of our no-par Capital Stock account. This results in a gradual amortization of excess valuations against Capital Stock rather than an abrupt write-down which might bring adverse comment."

Machinery Company

"If fixed assets are 'written down' some account such as Surplus must be charged with the amount written down.

"Would not the same results be obtained by charging only the proportion of depreciation on Fixed Assets that are in use to the operating statement for Profit and Loss purposes, and charging the remainder of depreciation to surplus? This method does not disturb the carrying value of Fixed Assets—which it seems to me should not be changed until conditions are more stabilized or until time has proven that present conditions and values are to be those of the future."

Commercial Organization

"It is my opinion that fixed assets should be written down at the present time to somewhere near present market prices. Commodity prices are lower now in some cases than they have been in the past 60 years, and it seems absolutely necessary to bring our assets in line with some close relation to their replacement values.

"When the reduction is put through it should be a direct charge to surplus—if there is a surplus to charge it to—otherwise to capital by reducing the par value or stated value of the shares, or by a proportionate reduction in the shares outstanding, etc.

"Every firm is up against reducing prices of the commodity it sells. Competitors with smaller plants, less overhead, etc., have the edge on a plant that has to absorb large charges to depreciation, etc., because its fixed assets are carried at too high a level.

"The firm which has reduced its fixed assets to somewhere near

the present value is in a better credit position should it be necessary to borrow at the bank."

Paper Company

"While a return to former price levels (although possible) is not to be expected there is no necessity for writing down the book values immediately. Yet under certain circumstances it is an expedient thing to do.

a. Writing down the book value reduces property taxes sometimes but by no means always or necessarily. It has no effect on insurance because insurable values are determined independently of book values.

b. As a matter of financial politics it may be better to charge off a lot of expense now so that there will be less expense to charge off in the future. This enables the company to give the appearance of increased earnings. This can be justified as sound accounting if the write off is in accordance with the principles set forth in Paragraph 2 below. When it goes beyond that (as many cases doubtless have) it is financial jugglery which must depend upon other than accounting principles for its justification.

c. If the company has a large surplus or if the stockholders are willing to reduce the outstanding capital stock to increase the surplus the reasons given above may be sufficient. It would seem both unnecessary and unwise, however, to write down the book values if the result is merely to create a deficit and indefinitely postpone the possibility of dividends.

d. Writing down book values has no necessary bearing on selling prices of products. Under present conditions depreciation is not a savable cost anyway and can be disregarded entirely in price making. Probably the competitors of most concerns are making prices which do not pay for depreciation. When depreciation is again a factor in determining selling prices, the depreciation in the standard cost can well be reduced to a replacement basis regardless of what is done on the balance sheet.

"Any such write-down could very properly be made according to the following principles:

a. If the equipment is likely to need replacing in kind it should be written down so that the annual depreciation during the remainder of its life will approximate the annual depreciation after

the replacement. If the rate of depreciation heretofore used has been right the net value will then be written down in ratio with the decline in replacement cost, new.

b. If the equipment is still to be used, but is less efficient than other available equipment, the future annual depreciation charge should be reduced so that the future standard cost of the product with the present equipment will not be greater (on account of depreciation) than with the more efficient equipment. The net valuation of the equipment should then be reduced to an amount not greater than the future depreciation such equipment is likely to be able to earn. If the reduction in current cost with the more efficient equipment exceeds the annual depreciation the present equipment should be written off entirely because no longer capable of earning depreciation. (Such equipment, however, would not be discarded unless the saving in cost was sufficient to amortize (depreciation and interest) the new equipment).

c. If there is no prospect that the selling price of the product will pay for the full depreciation on replacement cost of the equipment in addition to cash costs, although it will pay for cash costs and perhaps part of the depreciation, the equipment can be written down to a net valuation not exceeding the depreciation which the product is likely to be able to earn in the future.

d. If the equipment is never likely to be used again (with due allowance for a return to the production level prior to the depression) it can properly be written off entirely (at once or over a short period of years).

e. If the concern has consistently (as this company has) carried its assets at their liquidation value it can reasonably write down its assets to what they are likely to sell for after recovery from the present depression (provided it has a sufficient surplus or the stockholders with full knowledge of the facts consent to a reduction of capital stock).

"This company has written off assets not required in 1929; otherwise it has not made any special write off. This company has always followed the plan of writing off about 60% (varying for different assets) of the fixed assets at the time of purchase and the remaining 40% at the time of discard. This basis has been used as an attempt to carry the assets at resale or liquidation value. Hence, the company's assets are still undervalued on a replacement-

cost-minus-straight-in-line-depreciation basis. It has used the straight line depreciation basis in the makeup of its standard costs and may reduce the depreciation in its standard costs to a replacement basis when depreciation again becomes a factor in selling prices and the future price level can be better determined."

Conclusion

The number of replies which we have received to this questionnaire would probably not warrant our drawing any conclusions as to the extent to which the write-down movement has developed, nor the extent to which it may develop during the next year or two. In a great many of the companies in which no write-down of assets has occurred it was indicated that the problem was being seriously considered. If, as some business leaders seem to think, business conditions are nearer "normal" now than they were in 1928 and 1929, it is quite probable that the next year will witness a substantial spread of this write-down movement. The movement will perhaps not advance much further if, during the next few months, business conditions show any marked improvements. In any event, the revision of asset values should be undertaken only after a very careful consideration of all factors involved, and it is hoped and confidently expected that in these deliberations the advice and counsel of our accountants will be sought after and followed to a great extent.

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